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EXAMINER
WYATT, KEVIN S

ART UNIT	PAPER NUMBER
2878	

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Please find below and/or attached an Office communication concerning this application or proceeding.

8/

Office Action Summary	Application No.	Applicant(s)
	10/829,364	YAGAGUCHI ET AL.
	Examiner	Art Unit
	Kevin Wyatt	2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-14* is/are rejected.

7)☒ Claim(s) *2* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04/22/2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0404*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 4-5, 7-8, 10-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ueda (U.S. Patent No. 5,796,470).

Regarding claim 1, Ueda shows in Figs. 1A-B, 2A, and 2B-C, an optical moving amount detecting device comprising: a light emitter (1, i.e., light source element or semiconductor laser, col. 4, lines 23-24), a light receiver (9, i.e., photo detector, col. 4, line 44), a first optical system (11 and 12, i.e., lens units, col. 4, lines 31-33) for making light from the light emitter linear beam having a length and a width, the length extending in parallel with a direction of movement detection object and casting the linear beam on the detection object, a second optical system (combination of condenser lens (8) and lens unit (12), col. 4, line 43) by which a linear reflected beam that linear beam reflected (plurality of parallel beams (3), col. 1, lines 44-46) from the detection object made incident on the light receiver (col. 1, lines 44-58), a storage unit (22, i.e., cpu) for storing first output waveform signals (5a) that are outputted from the light receiver receiving (9, i.e., photo detector) the linear reflected beam at a first time point and that represent an output distribution of the linear reflected beam along longitudinal direction (x coordinate, see Fig. 2B) thereof and storing second output waveform signals that are

outputted from the light receiver receiving the linear reflected beam a second point and that represent an output distribution of the linear reflected beam along the longitudinal direction (x coordinate, see Fig. 2B) thereof, and a moving amount detecting unit detecting an amount of shift between the first output waveform signals and the second output waveform signals in the longitudinal direction of the linear reflected beams and detecting a moving amount of the detection object on basis of the amount of shift (col. 1, lines 56-63 and col. 2, lines 1-12).

Regarding claim 4, Ueda shows in Figs. 2B-C, that the moving amount detecting unit comprises a waveform correcting section (25, i.e., multiplier) for multiplying parts of the first output waveform signals and of the second output waveform signals by a plurality of coefficients (see equations 1-3, for doppler shift and light grating pitch interference) according to a light intensity distribution of the linear beam with respect to a longitudinal direction linear beams and thus correcting the light intensity distribution of the linear beam with respect to the longitudinal direction (col. 1, lines 56-63 and col. 2, lines 1-34).

Regarding claim 5, Ueda shows in Figs. 2B-C, the moving amount detecting unit comprises a moving amount calculating section (combination of cpu (22), serodyne waveform generator (24), multiplier (25), and thermal conductor (19), col. 6, lines 66-67, and col. 7, lines 2-4) for determining correlation coefficients (see formulas 4-8) between first output waveform partial signals that are outputted the first time point from a first partial area corresponding part an image the linear reflected beam on the light receiver with respect to the longitudinal direction and plurality of sets second output waveform

partial signals that are outputted the second time point from plurality partial areas corresponding a plurality of parts of an image of the linear reflected beam on the light receiver, determining a second partial area that results in a highest correlation coefficient at the second time point, and calculating the moving amount the detection object on basis of an amount of shift between the first partial area and the second partial area (see formulas 1-8).

Regarding claim 7, Ueda shows in Figs. 2B-C, an optical moving amount detecting device as claimed in claim 5, wherein the size of the whole area of the light receiver is equal to a sum of the size of the first partial area (area of beam (14a)), the moving amount of the image of the linear reflected beam which amount corresponds to the predetermined moving amount the detection object (7), and a predicted amount of positional shift of the detection object from the moving amount (col. 1, lines 56-63).

Regarding claim 8, Ueda shows in Figs. 2B, electronic equipment (combination of cpu (22) A/D converter (21) D/A converter (23), multiplier (25) and thermal conductor (19) comprising the optical moving amount detecting device as claimed in claim 1.

Regarding claim 10, Ueda shows in Figs. 1A-B, 2A, and 2B-C, an optical movement detector detecting movement of a detection object comprising: a light emitter (1, i.e., light source element or semiconductor laser, col. 4, lines 23-24), a first optical system (11 and 12, i.e., lens units, col. 4, lines 31-33) projecting a light beam having a cross section having a length and a width on the detection object (7) such that the length extends parallel to a direction of movement (x coordinate) of the detection object (see Figs. 2B-C), a light receiver (9, i.e., photo detector, col. 4, line 44) receiving a

reflection of the light beam from the detection object, a storage unit (22, i.e., cpu) for storing first output waveform signals from the light receiver at a first time and storing second output waveform signals from the light receiver at a second time, and a movement detecting unit detecting an amount of shift between the first output waveform signals and second output waveform signals and determining a movement amount of the detection object based on the detected amount of shift (col. 1, lines 56-63 and col. 2, lines 1-12).

Regarding claim 11, Ueda shows in Figs. 1A-B, 2A, and 2B-C, a method of optically detecting amount of movement of an object comprising the steps of: projecting light (beams 5a-b or 14a-b) against the object (7) to form a generally rectangular image having a length and a width such that the length aligned with a direction of movement (x coordinate) of the object; detecting first reflection the generally rectangular image from the object at first time and outputting first waveform (5a) signals related to the first detected reflection (14a); detecting a second reflection of the generally rectangular image from the object at a second time and outputting second waveform signals (5a) related to the second detected reflection (14a); measuring an amount of waveform shift between the first output waveform and the second output waveform signals an amount of object shift between the first time and the second time.

Regarding claim 12, Ueda shows in Fig. 2A a method of deflecting the first reflection of the generally rectangular image.

Regarding claim 13, Ueda discloses a method of multiplying a part of the first output waveform signals (5a) and a part of the second output waveform signals (5b)

(col. 7, lines 2-5) a plurality of coefficients according to a light intensity distribution of the linear beam with respect to longitudinal direction of the linear beam (see formulas 1-8), and correcting the light intensity distribution of the linear beam with respect the longitudinal direction (col. 1, lines 56-63 and col. 2, lines 1-34).

Regarding claim 14, discloses a method of determining correlation coefficients between first output waveform partial signals outputted at the first time point from a first partial area corresponding to a part of the reflected image of the linear beam with respect to the longitudinal direction and a plurality of sets of second output waveform partial signals outputted at the second time from plurality partial areas corresponding to a plurality of parts of the image of the linear beam (see formulas 4-8); determining a second partial area from the plurality of partial areas that results in a highest correlation coefficient at the second time, and calculating the amount movement of the object based on the shift between the first partial area and the second partial area (see formula 3 and 8, and col. 6, lines 34-51).

3. Claims 1, 3-6, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Brosnan (U.S. Patent No. 5,610,705).

Regarding claim 1, Brosnan shows in Figs. 1-2 an optical moving amount detecting device comprising: a light emitter (10, i.e., laser), a light receiver (24, i.e., pixels), a first optical system (the optics system within laser (10)) for making light from the light emitter linear beam (12, i.e., coherent laser beam, col. 5, line 14) having a length and a width, the length extending in parallel with a direction of movement a detection object (14, i.e., point, col. 5, line 17) and casting the linear beam on the

detection object, a second optical system by which a linear reflected beam that linear beam reflected from the detection object made incident on the light receiver (16, i.e., illumination), a storage unit (col. 6, lines 47-53 and 66-68) for storing first output waveform signals that are outputted from the light receiver (24, i.e., pixels)receiving the linear reflected beam at a first time point and that represent an output distribution of the linear reflected beam along longitudinal direction thereof and storing second output waveform signals that are outputted from the light receiver receiving the linear reflected beam a second point and that represent an output distribution of the linear reflected beam along the longitudinal direction thereof, and a moving amount detecting unit (combination of sensor or light receiver (24), limiting amplifier (36), and frequency counter (38)) detecting an amount of shift between the first output waveform signals and the second output waveform signals in the longitudinal direction of the linear reflected beams and detecting a moving amount of the detection object on basis of the amount of shift (col. 5, lines 28-34, and col. 6, lines 36-46).

Regarding claim 3, Brosnan shows in Figs. 1-2 a deflector (20, i.e., partially reflective/transmissive element) for deflecting the linear reflected beam from the detection object (14, i.e., point) provided between the first optical system (the optics system within laser (10)) and the detection object.

Regarding claim 4, Brosnan discloses a moving amount detecting unit (combination of sensor or light receiver (24), limiting amplifier (36), and frequency counter (38)) comprises a waveform correcting section (image sensor (24), col. 6, lines 36-46) for multiplying parts of the first output waveform signals and of the second output

waveform signals by a plurality of coefficients according to a light intensity distribution of the linear beam with respect to a longitudinal direction linear beams and thus correcting the light intensity distribution of the linear beam with respect to the longitudinal direction (col. 5, lines 37-43).

Regarding claim 5, the moving amount detecting unit (combination of sensor or light receiver (24), limiting amplifier (36), and frequency counter (38)) comprises a moving amount calculating section (frequency counter) for determining correlation coefficients between first output waveform partial signals that are outputted the first time point from a first partial area corresponding part an image the linear reflected beam on the light receiver with respect to the longitudinal direction and plurality of sets second output waveform partial signals that are outputted the second time point from plurality partial areas corresponding a plurality of parts of an image of the linear reflected beam on the light receiver, determining a second partial area that results in a highest correlation coefficient at the second time point, and calculating the moving amount the detection object on basis of an amount of shift between the first partial area and the second partial area (col. 5, lines 31-43).

Regarding claim 6, Brosnan shows in Figs. 1-2 a size of the first partial area of the light receiver such that the first output waveform partial signals outputted from the first partial area can be discriminated from signals outputted at the first time point from areas other than the first partial area in the light receiver and wherein a size of a whole area the light receiver is not smaller than a sum of the size of the first partial area and of

a moving amount of an image of the linear reflected beam which amount corresponds to a predetermined moving amount of the detection object (col. 5, lines 37-43).

Regarding claim 7, Brosnan shows in Figs. 1-2, a size of the whole area of the light receiver is equal to a sum of the size of the first partial area, the moving amount of the image of the linear reflected beam which amount corresponds to the predetermined moving amount the detection object, and a predicted amount of positional shift of the detection object from the moving amount.

Regarding claim 8, Brosnan discloses electronic equipment comprising the optical moving amount detecting device as claimed in claim 1 (col. 6, lines 45-50).

Regarding claim 10, Brosnan shows in Figs. 1-2, an optical movement detector detecting movement of a detection object comprising: a light emitter (10, i.e., laser), a first optical system (the optics system within laser (10)) projecting a light beam (12, i.e., coherent laser beam, col. 5, line 14) having a cross section having a length and a width on the detection object such that the length extends parallel to a direction of movement of the detection object, a light receiver (24, i.e., pixels) receiving a reflection of the light beam from the detection object, a storage unit (col. 6, lines 47-53 and 66-68) for storing first output waveform signals from the light receiver at a first time and storing second output waveform signals from the light receiver at a second time, and a movement detecting unit (combination of sensor or light receiver (24), limiting amplifier (36), and frequency counter (38)) detecting an amount of shift between the first output waveform signals and second output waveform signals and determining a movement amount of

the detection object based on the detected amount of shift (col. 5, lines 28-34, and col. 6, lines 36-46).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda (U.S. Patent No. 5,796,470) in view of Costanza (U.S. Patent No. 5,204,620).

Regarding claim 9, Ueda discloses the claimed invention as stated above. Ueda does not disclose a conveying section conveying the detection object, and a controller for controlling the conveying section so as to align with a target position after conveyance, on basis of moving amount of the detection position of the detection object that is detected by the optical moving amount detecting device. Costanza shows in Figs. 1, 3 and 5, a conveyance processing system (photoreceptor belt) comprising: a conveying section (I_1, I_2, I_3 or I_m) conveying the detection object, and a controller (35, i.e., belt servo controller) for controlling the conveying section so as to align with a target position after conveyance, on basis of moving amount of the detection position of the detection object that is detected by the optical moving amount detecting device (see Fig. 5). It would have been obvious to one skilled in the art to provide the photoreceptor belt of Costanza to the apparatus of Ueda, for the purpose of providing the continuous motion needed for object's velocity measurements.

Allowable Subject Matter

6. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

Claim 2 has allowable subject matter because the prior art fails to disclose or make obvious, either singly or in combination, an optical moving amount detecting device comprising, in addition to the other recited features of the claim, a light emitter composed of a plurality of semiconductor laser devices disposed linearly.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Becker (U.S. Patent No. 5,208,064) discloses a method and apparatus for optically monitoring and controlling a moving fiber of material.

Hutchins (U.S. Patent No. 3,994,583) discloses a noncontacting method and apparatus for monitoring the speed and travel of a moving article.

Kato (U.S. Patent No. 5,587,785) discloses laser doppler velocimeter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Wyatt whose telephone number is (571)-272-5974. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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